PART TWO

BIOCHEMISTRY

IMS
INNOVATIVE MEDICAL STUDENTS

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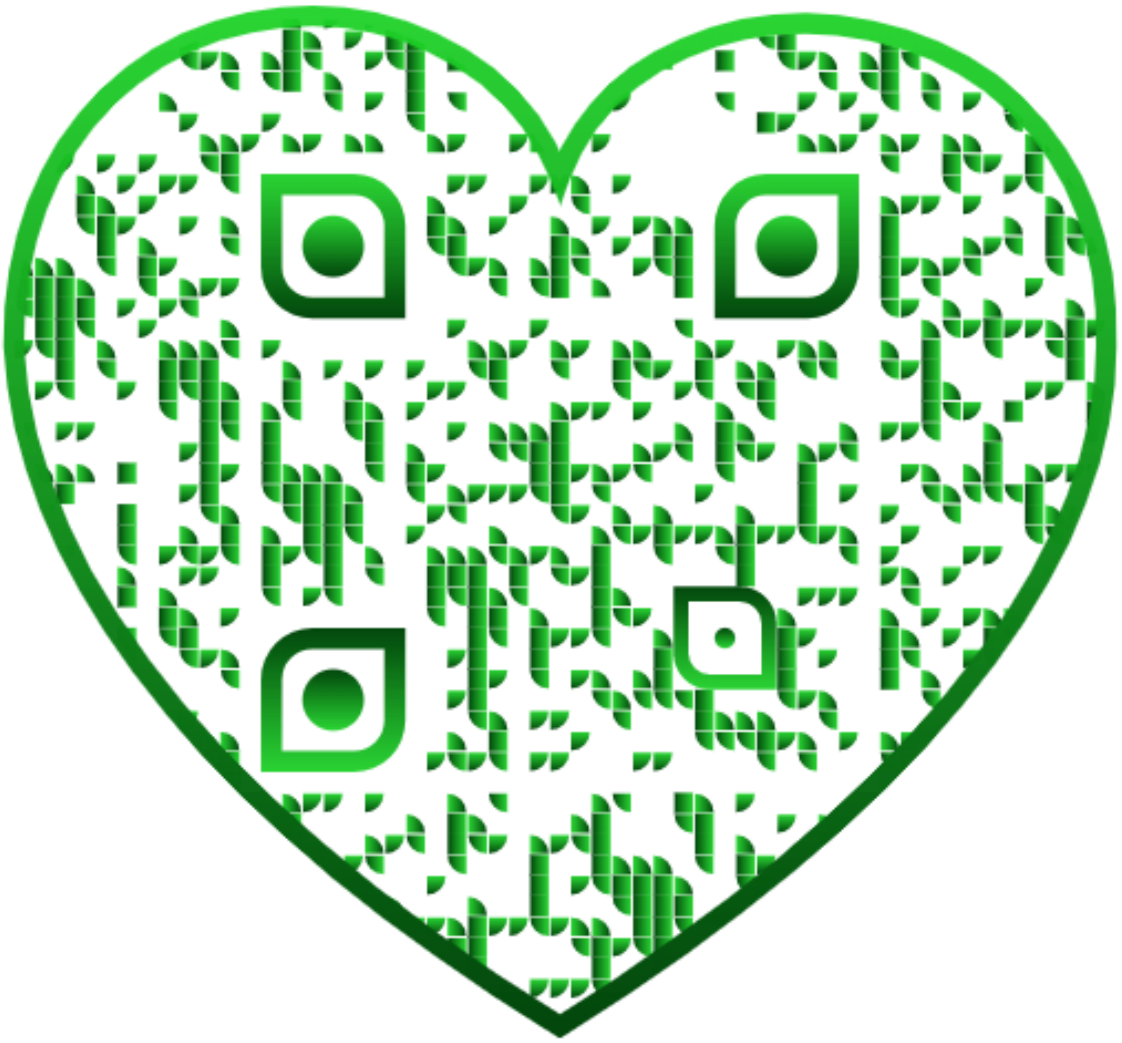

Gastrointestinal Tract

Q1: Complete the following:

1- Pepsinogen I secreted by ..... and is secreted in linked with ..... .
2- The receptors that increase secretion of HCL are ....., ..., ...
3- Gastrin secretion is inhibited or decreased by ....., ..., ...
4- CKK is hormone which is secreted form ....., it has an active fragment in the last ....., it's secreted in response to the presence of .....
5- The most causes of duodenum ulcer are ....., ..., ..., ...
6- Trypsin is specific for peptide bond of .....,while chemotrypsin is specific for peptide bond containing ..... residues such as .....
7- Biogenic amines are ....., ...
8- The intestinal enzymes are ....., ..., ...
9- Steatorrhea can result from ....., ...
10- If the flow of saliva is increase ....., ...
11- Cholesterol stone is caused by ....., ...
12- The excess Na, Cl excretion in sweat is caused by .....
13- Risk factor of pigment stone ....., ...
14- Chloride absorption is regulated by ....., ...
15- Causes of malabsorption syndrome are ....., ..., ...
16- First place of carbohydrate digestion is the ..... and produce ....., ..., ... and .....
17- Digestion of dextrin, glycogen and starch to ....., ..., ... by ..... enzyme .
18- For every H+ pumped into the lumen a HCO3 is released to blood and this is referred to as .....
19- The carbohydrate digestion sites are:
    a) .....by..... enzyme.
    b) .....by..... enzyme.
    c) .....by..... enzyme.
20- Acute gastritis can be defined as ....., while chronic gastritis defined as .....
21- Malabsorption system can be defined as .....
22- In case of ..... failure of absorption of vitamin B12 occur with the development of .....
23- HCL helps in iron absorption by .....
24- Primary bile acids in human bile are ..... and .....

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25- HCL formation in parietal cells depends on ..... and .....
26- Gastrin and CKK are similar in .....
27- Acetylcholine can stimulate the electrolytes through .....
28- In cholera there is uncontrolled of .....
29- A membrane-bond enzyme in γ Glutamyl cycle is ..... which catalyze transfer of ..... of glutathione into .....
30- Glucose and galactose are absorbed by .....
31- Celiac disease result from .....
32- Lipid and H inhibit gastric secretion by three ways ....., ...
33- Gastrin has an active fragment in the ..... and is secreted in response to ....., ..., ...
34- The action of secretin to stimulate the secretion of .....
35- Pepsin is an endopeptidase, specific for peptide bonds formed by ..... While trypsin is specific to .....
36- Cholecystokinin secretion is stimulated by the presence of ....., ... while secretin secretion is stimulated by the .....

Q2: Indicate if each of the following statements is true "T" or false "F":

1- Intestinal absorption of fats is accomplished largely by the transport of chylomicrons from the intestinal lumen to the blood ( )
2- Bile salts potentiate the activity of pancreatic lipase ( )
3- Bile salts are reabsorbed in the distal ileum ( )
4- Bile salts as present in the stools are the sodium salts of deoxycholic acid & lithocholic acid ( )
5- Bile salts are present in the micelles with their polar groups on the outside( )
6- Bile salts are the major anions of gall bladder bile ( )
7- Intestinal absorption of dietary glucose depends on intact pancreatic function ( )
8- Intestinal absorption of vitamin B12 requires its pervious digestion by intrinsic factor ( )
9- Gastrin is an exocrine hormone found in the gut ( )
10- Gastrin is secreted into the stomach in an inactive form where it is activated by Hydrochloric acid ( )
11- Secretin stimulates insulin secretion ( )
12- Secritin inhibits acid production in the stomach ( )
13- Cholera toxin causes massive and often fatal diarrhea by inactivating Gi protein ( )
14- Cholera toxin causes diarrhea by rapidly hydrolyzing G protein GTP to GDP( )
15- Zollinger-Ellison syndrome results in diarrhea ( )
16- Zollinger-Ellison syndrome has a greater than normal gastric acid secretion in response to pentagastrin ( )
17- Celiac disease can be distinguished from tropical sprue by the findings on intestinal biopsy( )

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18- Celiac disease is recognized cause of osteoporosis ( )
19- Alteration of bacterial flora in the intestinal typically causes iron deficiency ( )
20- Alteration of bacterial flora in the intestine causes impaired absorption of glucose( )

Q3: Write short notes on the following:

1- Gama-glutamyl cycle and the significance of glutathione.
2- Fate of absorbed fatty acids.
3- Chronic pancreatitis.
4- Carcinoid syndrome.
5- Alkaline tide
6- Alcoholism lead to pancreatitis
7- Hurtnup disease

Q4: Discuss each of the following:

1- The signaling mechanisms through which the various GIT secretions are released.
2- The components of bile secretion and its relation of the formation of gallstones.
3- Causes of peptic ulcer.
4- Acute pancreatitis.
5- Causes of acute pancreatitis.
6- Malabsorption.
7- Biosynthesis of bile salt.
8- Role of motility defect in gastric ulcer.
9- Absorption of amino acids.

Q5: Write the mechanism of the following:

1- Increase ca^{++} lead to acute pancreatitis.
2- Role of entrohepatic circulation in bile metabolism.
3- Chronic pancreatitis gives rise to haemochromatosis.

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Q6: Comment in the following statement:

1- Cystic fibrosis as result from defect of Cl channels.
2- The role of prostaglandin in peptic ulcer.
3- The ability of H pylori to survine the high acidity of stomach.
4- Junction of cytochrome P450 has important in clinical amplification.

Q7: Answer the following questions :

1- Write about the factors affect iron absorption.
2- Explain why:
   a) HCL help in some regulation in the gastric emptying.
   b) The PH is increased in blood and urine follow ingestion
   c) Role of H pyloric according to the location.
3- Describe the mechanism by which cholera toxin activates the GIT secretions.

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MOLECULAR

Q1: Choose the most correct answer:

1- The pseudogene are defined as:

a) expressed.
b) non-sense.
c) regulate development of organs in infants.

2- The primer is defined as:

a) segments of oligonucleotides of DNA.
b) attach to the 5 end of DNA.
c) attach to the 3 end of DNA.

3- The preferred modification bases are:

a) A-C
b) C-G
c) A-T

4- The leading and lagging strands are formed during:

a) initiation of replication.
b) initiation of transcription.
c) elongation of replication.
d) elongation of transcription.

5- Repair of pyramidine dimmer :

a) mismatch repair .
b) base excision repair .
c) nucleotide excision repair.

6- In translation initiation:

a) methyl –tRNA binds first at A site.
b) eTF_2 with 4Ds subunit bind for preinitiation complex .
c) eF_2 is phosphorylated by GTP.
d) mRNA,60s subunit forming the initiation factor.

7- Which of the following enzymes are used to join bits of DNA?

a) DNA ligase
b) DNA polymerase
c) primase
d) Endonuclease

8- Semi conservative replication of DNA was first demonstrated in

a) Escherichia coli
b) Streptococcus pneumonae
c) Salmonella typhimuriam
d) Drosophila melanogaster

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9- Mode of DNA replication in E.coli is

a) Conservative and unidirectional
b) Semiconservative and unidirectional
c) Conservative and bidirectional
d) Semiconservative and bidirectional

10- When DNA replication starts

a) The phosphodiester bonds between the adjacent nucleotides break
b) The bonds between the nitrogen base and deoxyribose sugar break
c) The leading strand produces Okazaki fragments
d) The hydrogen bonds between the nucleotides of two strand break

11- During the replication of DNA, the synthesis of DNA on lagging strand takes place in segments, these segments are called

a) Satellite segments
b) Double helix segments
c) Kornbeg segments
d) Okazaki segments

12- The elongation of the leading strand during DNA synthesis

a) Progresses away from the replication fork
b) Occur in 3'-5' direction
c) Produces Okazaki fragment
d) Depend on the action of DNA polymerase

13- Eukaryotes differ from prokaryote in mechanism of DNA replication due to:

a) Different enzyme for synthesis of lagging and leading strand
b) Use of DNA primer rather than RNA primer
c) Unidirectional rather than bidirectional replication
d) Discontinuous rather than semidiscontinuous replication

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14- True replication of DNA is possible due to

a) Hydrogen bonding
b) Phosphate backbone
c) Complementary base pairing rule
d) None of the above

15- Unwinding of DNA is done by

a) Helicase
b) ligase
c) Hexonuclease
d) Topoisomerase

16- DNA synthesis can be specifically measured by estimating the incorporation of radio labelled

a) uracil
b) thymine
c) Adenine
d) Deoxyribose sugar

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17- The process involved in the RNA formation on the DNA template is

a) Transcription
b) Translation
c) Replication
d) Transformation

18- The enzyme required for transcription is

a) Restriction enzymes
b) DNA polymerase
c) RNA polymerase
d) RNAase

19- Transcription is the transfer of genetic information from

a) DNA to RNA
b) tRNA to mRNA
c) DNA to mRNA
d) mRNA to tRNA

20- RNA required for the protein synthesis

a) mRNA
b) tRNA
c) rRNA
d) All of these

21- A promoter site on DNA

a) Initiates transcription
b) Regulates termination
c) Codes for RNA
d) Transcribes repressor

22- Sigma factor is component of

a) DNA ligase
b) DNA polymerase
c) RNA polymerase
d) endonuclease

23- What is the main function of tRNA in relation to protein synthesis?

a) Inhibits protein synthesis
b) Proof reading
c) Identifies amino acids and transport them to ribosomes
d) all of these

24- RNA polymerase (Ochoa 1953) has polypeptide chains

a) 2
b) 3
c) 4
d) 5

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25- Which site of tRNA molecule hydrogen bonds to a mRNA molecule?

a) Codon
b) Anticodon
c) 5'ends of the tRNA molecule
d) 3'ends of the tRNA molecule

26- The DNA chain acting as template for RNA synthesis has the following order of bases, AGCTTCGA. What will be the order of bases in mRNA?

a) TCGAAGCT
b) UGCUAGCT
c) TCGAUCGU
d) UCGAAGCU

27- Genetic code is

a) the sequence of nitrogenous bases in mRNA molecule that codes for a protein
b) is a triplet code
c) is non-overlapping
d) all of these

28- Translation is the

a) synthesis of DNA from a mRNA template
b) synthesis of protein from a mRNA template
c) synthesis of RNA from a mRNA template
d) synthesis of RNA from a DNA template

29- Translation occurs in the

a) nucleus
b) cytoplasm
c) nucleolus
d) lysosome

30- During translation, proteins are synthesized

a) by ribosomes using the information on DNA
b) by lysosome using the information on DNA
c) by ribosomes using the information on mRNA
d) by ribosomes using the information on rRNA

31- The enzyme involved in amino acid activation is

a) ATP synthetase
b) aminoacyl tRNA synthetase
c) aminoacyl mRNA synthetase
d) aminoacyl rRNA synthetase

32- Which of the following RNA molecules serves as an adaptor molecule during protein synthesis

a) rRNA
b) mRNA
c) tRNA
d) tRNA and mRNA

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33- In Prokaryotes, the first amino acid in the polypeptide chain is

a) methionine
b) N-methyl methionine
c) N-formyl methionine
d) All of these

34- In Prokaryotes, the ribosomal binding site on mRNA is called

a) Hogness sequence
b) Shine-Dalgarno sequence
c) Pribnow sequence
d) TATA box

35- During translation, the role of enzyme peptidyl transferase is

a) transfer of phosphate group
b) amino acid activation
c) peptide bond formation between adjacent amino acids
d) binding of ribosome subunits to mRNA

36- Polysomes are

a) aggregation of ribosomes
b) aggregation of lysosomes
c) mRNA molecules to which many ribosomes are attached simultaneously
d) all of these

37- Which is the energy rich molecule required for initiation of translation

a) ATP
b) GTP
c) CTP
d) AMP

38- eRF1 is the release factor in eukaryotes that requires

a) ATP for its binding to ribosome
b) GTP for its binding to ribosome
c) ATP and GTP for its binding to ribosome
d) Mn2+for its binding to ribosome

39- In eukaryotes, translation is initiated by binding of ribosome to the

a) Pribnows box
b) Hogness box
c) 5'cap
d) poly A tail

40- hsp 60 and 70 are proteins involved in

a) initiation of translation
b) elongation of translation
c) termination of translation
d) protein folding

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41- Tetracycline blocks protein synthesis by

a) inhibiting binding of aminoacyl tRNA to ribosome
b) inhibiting initiation of translation
c) inhibiting peptidyl transferase
d) inhibiting translocase enzyme

42- Which of the following biomolecule has self-repair mechanisms?

a) DNA,RNA and protein
b) DNA and RNA
c) DNA only
d) DNA and proteins

43- Which of the following chemicals induce depurination

a) methyl ethane sulphonate (MES)
b) nitrosoguanidine
c) ethyl ethane sulphonate (EES)
d) all of these

44- Which of the following mechanism of DNA polymerase helps in preventing error during DNA replication

a) rechecking
b) proof checking
c) proof reading
d) all of these

45- The proteins involved in mismatch repair are

a) Mut S
b) Mut H
c) Mut L
d) all of these

46- Which of the following dimer formation is most common

a) thymidine dimer
b) cytidine dimer
c) both a and b
d) none of these

47- Dimer repair mechanism include

a) excision repair
b) photoreactivation
c) recombinational repair
d) all of these

48- Thymine dimers are often corrected by light induced repair mechanism. The enzyme involved in the process is

a) photolyase
b) photoligase
c) DNA glycosylase
d) All of these

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49- Which of the following is dark repair

a) nucleotide excision repair (NER)
b) base excision repair (BER)
c) both a and b
d) none of these

50- DNA glycosylase is an enzyme involved in base excision repair. The function is

a) addition of correct base
b) addition of correct nucleotide
c) removal of incorrect base
d) removal of phosphodiester bond

51- Recombinational repair is often due to

a) incorporation of many incorrect nucleotides by DNA polymerase
b) many cytidine dimer and associated large gaps in a strand
c) many thymidine dimer formation and associated large gaps in a strand
d) all of these

52- Which is the DNA polymerase involved in BER

a) DNA polymerase α
b) DNA polymerase β
c) DNA polymerase σ
d) DNA polymerase £

53- Which of the following is a bypass repair system

a) BER
b) NER
c) SOS
d) Recombinational repair

54- DNA repair mechanism is absent in

a) nuclear genome
b) mitochondrial genome
c) chloroplast genome
d) both b and c

55- umu C, umu D gene family and Rec A proteins are involved in

a) BER
b) NER
c) SOS repair
d) Recombinational repair

56- The distortion in DNA helix due to pyrimidine dimer formation is called as

a) nick
b) single stranded breaks
c) kink
d) none of these

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57- Proinsulin modification doesn't involve:

a) Formation of 2 peptide chain
b) Formation of peptide C
c) Carboxylation

58- Pantathonic acid helps in process of :

a) Decarboxylation
b) Reduction
c) Oxidation

59- DNA methylation is a mechanism for changing:

a) The bases sequence of tRNA, with altering its coding function
b) The bases sequences of RNA, with altering its coding function
c) The bases sequences of DNA, without altering its coding function
d) The bases sequences of DNA, with altering its coding function

60- Topoisomerases are enzymes that can:

a) Untwist the bases of DNA or RNA to serve as a template
b) To relax or insert supercoils
c) To add prime
d) To remove the prime

Q2: Complete the following:

1- Pseudogene can be defined as……
2- The most methylated bases are ……and …… .
3- The prime can be defined as ……
4- The initiation site of replication in prokaryotic is ……
5- Nick translation can be defined as …… ……
6- The main causes of mutation are ……, ……, ……
7- The some feature of codon are ……, ……, ……
8- Non acceptable missense occurs when ……
9- Nucleotide excision repair correct error made by ……
10- The pyrimidine dimmer induced by UV can be repaired by ……
11- The post transcriptional modification of mRNA include ……, ……
12- Mismatch repair correct error made from ……but excision repair correct error made by …… or …… .
13- Replication means …… .
14- Function of 5→ 3 exoneuclase is …… .
15- Second stage of replication is the ……and ……

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16- One function of polymerase is proofreading which means .....
17- Tautomerization of the bases means .....and lead..... .
18- Methylation means ..... and the most frequent methylated bases are .....
19- Secondary structure of DNA depend on .....or..... .
20- Forms of DNA are ..... .
21- Tertiary structure of DNA ..... .
22- Genome is ..... .
23- Gene is ..... .
24- Types of gene ..... .
25- tRNA has.....bases.
26- hnRNA is the precursor of ..... .
27- To mature the 3end of mRNA required..... and its important is .....
28- To mature the 5end of mRNA required..... and its function is .....
29- CDK (cyclin dependent kinase) is ..... and use to .....
30- The direction of replication is ..... .
31- Replisomes are ..... .
32- SSB protein is used to ..... .
33- The 3end→5end nuclease activity is called .....while the 5end→3end nuclease activity is called ..... .
34- The most active DNA polymerases in prokaryotic repair is ..... while in eukaryotic ..... .
35- Reverse transcription is..... .
36- The function of the telomere is .....and is induced by.....and may increase in .....and decrease in ..... .
37- The rate of replication in eukaryotic is .....nu/s and is ..... than that of the prokaryotic cells.
38- During replication the ..... is normally copied, but the transcription is .....
39- The unwinding is important during transcription due to ..... .
40- The action of gyrase ..... .
41- Holoenzyme include ..... .
42- DNA transcripted is inhibited by ..... and ..... .
43- The gene expression occur at the level of the ..... due to .....
44- Transcripted buble contain....., ...
45- Promoter means .....
46- Frameshift mutation means .....
47- The structural gene function for .....
48- Function of 3→ 5 exoneuclase is .....
49- Mutation means .....
50- The codon of initiation is .....
51- Non-sense mutation is .....

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52- Histones and the nucleosomes required in .....
53- Causes of point mutation are ....., ...
54- The 2nd step of replication is ..... and ..... are formed

Q3: Write about the following:

1- Formation of lagging strand during DNA replication.
2- Role of RNA polymerase.
3- Role of tRNA in translation.
4- Mutation (definition, type ,causes) .
5- Type of gene.
6- Double strand repair.
7- Non-sense mutation.
8- Degenerate codon.
9- DNA polymerase enzyme.
10- Five properties of genetic codon.
11- Small interferens RNA (siRNA).
12- Second step in replication.
13- Termination of transcription by P(rho) independent protein.
14- Function of the (Rb-P35)in regulation of the cell cycle.
15- Role of rho protein in termination of replication
16- Third stage of protein synthesis

Q4: Illustrate the 4th step of translation.

Q5: Enumerate the mechanism of DNA repair.

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RESPIRATION

Q1: Choose the most correct answer:

1- Cell respiration involve all of the following except:

a) formation of acetyl co A.
b) formation of NADPH+H.
c) oxidation of FADH2.
d) oxidation of NADH+H.
e) oxidation of acetyl co A.

2- The terminal electrons acceptor in respiratory chain is:

a) Cytochrome C.
b) FAD.
c) molecular oxygen.
d) coenzyme Q.
e) A and C.

3- Carbon monoxide inhibits the transfer of electrons from:

a) $FADH_2$ to Coenzyme Q.
b) cytochrom C to Coenzyme Q .
c) cytochrom C to molecular oxygen.
d) NADH+H to Coenzyme Q.
e) none of the above.

4- Coenzyme Q accept electron from:

a) NADH+H.
b) NADPH+H.
c) FADH2
d) A and C.
e) All of the above.

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5- Cytochrom P450 is important for:

a) drug detoxification.
b) respiratory chain.
c) formation of tyrosine for phenylalanine.
d) A and C.
e) all of the above.

6- ATP can be formed in the cytosol by:

a) oxidative phosphorylation.
b) Substrate-level phosphorylation .
c) oxidative and Substrate-level phosphorylation.
d) A and C.
e) none of the above.

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7- Transport of cytoplasmic NADH+H to matrix of mitochondria by:

a) Malate - aspartate shuttle.
b) Carnitine shuttle.
c) albumin.
d) tricarboxylate transport system.
e) none of the above.

8- Which of the following energy coupling hypothesis can explain the mechanism of substrate – level phosphorylation in the cytosol:

a) chemiosmotic energy coupling hypothesis.
b) chemical energy coupling hypothesis.
c) conformational energy coupling hypothesis.
d) B and C.
e) all of the above.

9- Reduced form of coenzyme Q can be oxidized by the action of:

a) cytochrome oxdidase.
b) NADH-CoQ reductase.
c) cytochrome C-CoQ reductase.
d) succinate-CoQ reductase.
e) none of the above.

10- NADH-CoQ reductase catalyze the oxidation of :

a) NADPH+H.
b) FADH2.
c) NADH+H.
d) succinate
e) none of the above.

11- The energy released when electrons transport from NADH+H to cytochrome C is enough to synthesis:

a) 1 ATP.
b) 2 ATP.
c) 5 ATP.
d) 3.46 ATP.
e) 2.5 ATP.

12- The inhibitor or electron transport from CoQ to cytochrome C is:

a) rotenone.
b) antimycine A.
c) amytal.
d) carbon monoxide.
e) none of the above.

13- Oxygen can be toxic when is accept:

a) 4 electron and 4 proton.
b) 2electron and 2 proton.
c) 1electron
d) B and C
e) All of the above.

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14- Cell can detoxify superoxide radical by:

a) enolase.
b) superoxide dismutase and glutathione peroxidase.
c) glutathione peroxidase and superoxide dismutase.
d) reductase and hydratase.
e) none of the above.

15- Which of the following observation can explained by chemiosmotic energy coupling hypothesis:

a) oxidative phosphorylation requires an intact inner mitochondrial membrane.
b) electron transport results in transport of protons out of intact mitochondrial ,thereby creating a measurable electrochemical gradient across the inner mitochondrial membrane.
c) oxidative phosphorylation does not requires an intact inner mitochondrial membrane.
d) A and B.
e) all of the above.

16- Molucular oxygen (O2):

a) is used for oxidative phosphorylation .
b) used for hydroxylation oxygenation reaction.
c) used to produce free radical.
d) all of the above.

17- Characteristic of free radical:

a) long lived.
b) unstable.
c) inactive.
d) both B and C.

18- Reactive species:

a) include free radicals and oxidants.
b) increase during chronic infection.
c) increase during strenuous exercise.
d) all of the above .

19- Malondialdehyde:

a) indictor of free radical damage.
b) used for treatment of constipation.
c) used in treatment of hepatic encephalopathy.
d) all of the above.

20- Endogenous antioxidant.

a) uric acid.
b) vitamin E.
c) lycopene .
d) caratenoids.

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21- Oligomycin:

a) bind to the Fo of the ATP synthase.
b) prevent thrombosis.
c) is uncoupler.
d) both A and C.

22- Most ATP is produced by :

a) oxidative phophorylation.
b) substrate level phophorylation.
c) methylation.
d) carboxylation.

23- Almost all of oxygen one consume in breathing is converted to:

a) acetyl co A.
b) carbon dioxide.
c) carbon monoxide then dioxide.
d) none of the above (water).

24- If electron transfer in tightly coupled mitochondria is blocked with antimycin A between cytochrome b and cytochrome C1 then:

a) all ATP synthesis will stop.
b) electron transfer from NAD will cease but O2 uptake will continue.
c) electron transfer from succinate to O2 will continue.
d) energy diverted from cytochrome will used to make ATP.

25- In normal mitochondria the rate of NADH oxidation will:

a) be increased in active muscle and decreased in inactive muscle.
b) be very low if ATP is inhibited .
c) decrease if mitochondrial ADP is depleted.
d) all of the above.

26- Which of the following statement of the chemiosmotic theory is false:

a) electron transfer in mitochondria is accompanied by an asymmetric release of proton on one side.
b) energy is conserved as transmembrane PH gradient.
c) oxidative phosphorylation cannot occur in membrane free preparation.
d) the membrane ATPase has no significant role chemiosmotic theory.

27- Which of the following statement about energy conservation in mitochondria is false:

a) drug which inhibit ATP synthase will also inhibit flow of electrons.
b) the yield of ATP per mole of oxidizable structure depends on the substrate.
c) uncouplers have exactly the same effect on electron transfer as inhibitors.
d) none of the above.

28- During oxidative phosphorylation the proton motive force that is generated by electron transport is used to:

a) create a pore in the inner mitochondrial membrane.
b) induce a conformational change in the ATP synthase.
c) oxidize NADH to NAD.
d) reduce O_2 to H_2O.

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29- The relative concentration of ATP and ADP control the cellular rate of:

a) glycolysis.
b) oxidative phosphrylation.
c) citric acid cycle.
d) all of the above.

30- Oxidizing or reducing agent may exist as:

a) oxidant form only.
b) reduced form.
c) conjugate pair of oxidant and reducatant form.
d) none of these.

31- In the first step of oxidation one $NADH.H^+$:

a) 4 electrons transfer to CoQ .
b) 2 electron and 2 protons transfer to FMN.
c) 2 electrons only transfer to FMN.
d) 4 protons transfer to cytochrom C.

32- Enzymes catalyzes transfer and incorporated of oxygen into substrate are:

a) oxidase enzymes.
b) oxygenase Enzymes .
c) catalases enzymes.
d) peroxidases enzymes.

33- Cytochrome P450 is a member of which family of oxidoreductases:

a) catalaeses.
b) hydroperoxidase.
c) dehydrogenases.
d) oxygenases.

34- In the respiratory chain the relatively most electropositive molecule is:

a) NADH+H.
b) FMN.
c) cytochrome b.
d) O2.

35- The chemiosmotic hypotheses proposes that ATP is formed because:

a) the inner mitochondrial membrane becomes permeable to protons.
b) the inner mitochondrial membrane becomes permeable to electon.
c) the inner mitochondrial membrane becomes rich in high energy protein complex.
d) a proton gradient is formed across the inner membrane.

36- If the Free energy change ΔG^o Of a reaction is negative, this means:

a) the reaction can proceed reversibly.
b) the reaction needs a source of energy to proceed.
c) the free energy of reactant is more than the product.
d) none of the above.

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37- The substrate level phosphorylation means:

a) formation of ATP in the respiratory chain.
b) formation of ATP from high energy compound .
c) formation of NADH+H from oxidation of food stuff.
d) none of the above.

38- The transfer of reducing equivalents through the respiratory chain depends upon:

a) the difference in their redox potential.
b) their content of iron in the form of ferrous.
c) their molecular weight .
d) all of the above.

39- In heme synthesis ALA synthase enzyme is

a) catalyzing the formation of prophobilinogen.
b) catalyzing an irreversible exergonic reaction.
c) a mitochondrial enzyme.
d) both cytoplasmic and mitochondrial enzyme.

40- The group of oxidoreductase which cytochrome P450 is related to is:

a) oxygenate.
b) dehydrxylase.
c) oxidase.
d) hydroperoxidase.

41- All of the following are antioxidants except:

a) H_2O_2.
b) vitamin C .
c) Vitamin E.
d) catalase enzyme.

42- The protein complex is found in:

a) outer membrane.
b) inner membrane.
c) inner membrane space.
d) mitochondria.

43- As regard to heme biosynthesis :

a) it occurs exclusively in mitochondria.
b) it occurs through a group of reversible enzymes.
c) it occurs in both cytosol and mitochondria.
d) it occurs exclusively in cytosol.

44- In internal respiration all of these occur except:

a) removal of CO2 from the body.
b) utilization of O2.
c) production of CO2 by cell.
d) gaseous exchange between the cells and their fluid medium.

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45- Oxidation reduction potential:

a) Depend on the number of electrolytes in the reaction
b) It is the affinity of a substance to accept electrons
c) Both A and B
d) None of these

46- The superoxide anion O_2 is removed from the body by superoxide dismutase enzyme as:

a) H_2O molecule
b) O_2 molecule
c) H_2O_2 molecule
d) – OH group

47- H2O2 is considered as free radical due to:

a) It is present in high concentration
b) It is toxic molecule
c) It is highly reactive molecule
d) None of the above

48- The Free energy change (ΔG^o) depends on:

a) The nature and concentration of the initial reactants only
b) The nature and concentration of the final products only
c) The nature and concentration of the initial reactants and final products
d) None of the above

49- In endergonic reactions:

a) Reactions will proceed spontaneously
b) Reactions need energy source to proceed
c) The products contain less energy than the reactant
d) The reactions are reversible

50- ATP is important for all of these except:

a) Muscle contraction
b) Synthesis of macromolecules
c) Support the exergonic reaction
d) Active transport across membranes

51- The protein complexes of respiratory chain are located:

a) In the mitochondrial matrix
b) In the inner-mitochondrial membrane
c) In the intermembranous space
d) On the outer mitochondrial membrane

52- The outer mitochondrial membrane:

a) Contains the electron transport chain
b) Is deeply invaginated to produce a large surface area
c) Contains acyl-CoA synthetase
d) Contains the tricarboxylic acid cycle enzymes

INNOVATIVE MEDICAL STUDENTS

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53- In the respiratory chain co Q to be reduced (quinol form) must accept:

a) One electron and one proton
b) Two electrons only
c) Two protons only
d) Two electrons and two protons

54- Reduction means:

a) Addition of oxygen to a compound
b) Addition of hydrogen to a compound
c) Removal of electron from a compound
d) Removal of hydrogen from a compound

55- During ATP synthesis, an electrochemical potential differences occurs due to:

a) Transfer of electrons from electron donor to electron acceptor
b) Pumping of (H^+ ions) from inside to outside of the inner mitochondrial membrane
c) Transport of NADH+H from cytosol to mitochondria
d) Oxidation of acetyl CoA in the citric acid cycle

56- All of these are antioxidants scavenging free radicals except:

a) Hydrogen peroxide
b) Glutathione peroxidase
c) Vitamin E
d) Catalase enzymes

57- In the respiratory chain:

a) Electrons flow from electron donor to oxygen
b) ATP is formed
c) Electrons flow from the more electronegative to the more electropositive components
d) All of the above

58- ALA synthase enzyme is:

a) Catalyzing the formation of uroporphyrinogen
b) Induced by increased heme
c) A cytoplasmic enzyme
d) Catalyzing the formation of δ-aminolevulinate

59- Oxidation of pyruvate to acetyl CoA is decreased by all of these except:

a) Increased level of ATP
b) Increased level of NADH+H
c) Increased level of thiamine pyrophosphate (TPP)
d) Increased level of acetyl CoA

60- A mobile carrier molecule in the respiratory chain is:

a) Coenzyme Q
b) Cytochrome a
c) Cytochrome b
d) Cytochrome a3

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61- Respiratory chain is inhibited by all of the following except:

a) Increase NADH+H
b) Increase ATP
c) Increase acetyl CoA
d) Increase TTP

62- The most powerful antioxidant in the body is:

a) Vitamin E
b) Vitamin C
c) Catalase

63- All of these processes occur in mitochondria except:

a) Citric acid cycle
b) Oxidative phosphorylation
c) Ketogenesis
d) Glycolysis

64- The function of cytochrome C in complex IV is:

a) Transfer electron to O_2 to form H_2O
b) Pump proton
c) Both of them
d) None of them

65- The electrochemical gradient across the inner mitochondrial membrane is caused by:

a) The inner mitochondrial membrane become permeable to proton
b) The outer mitochondrial membrane become permeable to proton
c) Proton pump across inner membrane

66- The coenzyme Q (CoQ) is transferred to ubiquinol by:

a) Adding one electron and one proton
b) Adding 2 electrons and 2 protons
c) Adding 2 protons
d) Addition of 2 electrons

67- Which of the following is endogenous source of free radicals:

a) Electron transport chain
b) Oxidant enzyme
c) Bacterial infection
d) All of the above

Q2: Write about the following:

1- Damage that is produced by reactive oxygen species.
2- Coenzyme (CoQ).
3- How cyanide inhibits respiratory chain.
4- Transfer of $NADH+H^+$ from cytosol to mitochondria.
5- Reaction catalyzed by CoQ cyt.C reductase.

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Q3: Calculate the ATP generated from transfer of two electron from (NADH+H)(-0.254) to CoQ (+0.415) if faraday constant is 23?

Q4: Calculate the number of ATP produced when electron transport from NADH+H (E = -0.315 volt) to cytochrome C (E = +0.245 volt) Faraday constant = 23 Kcal

Q5: Write what you know about the following:

1- Mono-oxygenases.
2- Glycerol-3-phosphate shuttle.
3- Substrate level phosphorylation and give example.
4- Evidences of the chemi-osmotic hypothesis.
5- Biosynthesis of ATP.
6- Chemo-osmotic in a decoupling hypothesis.
7- Uncoupling of oxidative phosphorylation in brown adipose tissue.

Q6: Explain the following:

1- Transport of cytoplasmic NADH+H from the cytosol into matrix of mitochondria.
2- Reaction by CoQ - cytochrome C reductase

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ENDOCRINE

Q1: Choose the most correct answer:

1- **Steroid hormones:**
   a) form complexes with protein to travel through the blood plasma.
   b) are lipids soluble .
   c) are able to pass through the cell membrane .
   d) all of the above are correct .

2- **The hormone needed for normal long bone growth in children is :**
   a) ACTH.
   b) somatostatin.
   c) cortisol .
   d) growth hormone.

3- **Which of the following is not an effect of luteinizing hormone (LH):**
   a) increases testosterone secretion by stimulating leydig cells.
   b) causes the mature Graafian follicle to ovulate .
   c) promotes production of the corpus luteum
   d) promotes proliferation of endometrium.

4- **The anterior pituitary gland :**
   a) has no vascular connection with the hypothalamus.
   b) controls the function of the adrenal medulla
   c) controls the production of thyroxine from the thyroid gland.
   d) has cells that synthesize ADH.

5- **What is the major source of thyroxin T4:**
   a) hypothalamus.
   b) pituitary.
   c) thyroid gland.
   d) pancreas.

6- **Which hormone(s) bind to intracellular receptors:**
   a) catecholamines.
   b) peptide hormones.
   c) thyroid hormones.
   d) water soluble hormones.

7- **The secretion of which of the following hormones would be increased in a person with endemic goiter (due to iodine deficiency):**
   a) parathyroid hormone.
   b) thyroxin.
   c) thyroid stimulating hormone (TSH).
   d) calcitonin.

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8- Which hormone suppresses growth hormone secretion :

a) CRH
b) TRH
c) GHRH
d) somatostatin.

9- Which hormone is produced by the pancreas:

a) prolactin.
b) oxytocin.
c) CCK.
d) somatostatin.

10- The chemicals that are produced by secretory cells and secreted into the blood stream are the :

a) autocrines.
b) classic hormones (endocrines).
c) paracrines.
d) pituitary hormones.

11- What is an important target for prolactin:

a) the myoepithelial cells in the breast.
b) certain neurons in the hypothalamus .
c) the smooth muscle cells in the uterus.
d) thyroid gland.

12- A Pancreatic hormone that increases cell uptake and use of glucose is :

a) glucagon.
b) adrenaline.
c) insulin.
d) cortisol.

INNOVATIVE MEDICAL STUDENTS

13- Which of the following factors result in a decrease of insulin secretion:

a) hyperglycemia .
b) hypoglycemia.
c) a reduction of insulin inhibiting hormone.
d) a decrease in glucagon levels.

14- Which of the following metabolic processes will decrease when insulin is present in the system:

a) protein formation.
b) glycogen formation.
c) lipogenesis.
d) ketogenesis.

15- Ovulation :

a) is induced by a surge of LH.
b) normally occurs on day one of the menstrual cycle.
c) occurs when the egg reaches the oviduct .
d) is induced by a surge of progesterone.

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16- Which of the following hormones is produced by the pituitary :

a) growth hormone.
b) insulin.
c) progesterone.
d) gondadotropin-releasing hormone.

17- The estrogens are what class of steroid:

a) C_{21}
b) C_{19}
c) C_{18}
d) none of the above.

18- All the following statements are true except:

a) LH and FSH are released in pulsatile manner.
b) long-loop negative feedback is not required for LH and FSH pulsatility.
c) pulsatile LH and FSH release is necessary to avoid receptor desensitization.
d) an ovarectomized female will not exhibit pulsatile LH and FSH release.
e) pulsatility of LH and FSH release is governed by hypothalamus.

19- Regarding the pituitary gonadotropins, which of the following statements is true:

a) GnRH stimulates FSH release more than it stimulates LH release.
b) long-loop negative feedback from LH inhibits GnRH release.
c) short-loop negative feedback from LH inhibits GnRH release .
d) inhibin is produced by sertoli cells and inhibits LH secretion.
e) testosterone inhibits LH secretion more than it inhibits FSH secretion.

20- The shift from negative and positive feedback on the hypothalamus-pituitary –gonadic-axis that occurs at ovulation is characterized by, among other things:

a) a surge in pulsatile estradiol secretion.
b) a surge in pulsatile LH secretion.
c) a surge in pulsatile progesterone secretion.
d) a surge in pulsatile testosterone secretion.

21- Luteinizing hormone, follicle-stimulating hormone and chorionic gonadotropin:

a) each act on distinct cell types.
b) all act via cyclic-3',5'-adenosine monophosphate mediated mechanisms.
c) all possess the same β-subunit within the species.
d) all are secreted proteins.

22- Regarding ovarian secretions, all of the following statements are true except:

a) the principal hormonal secretions of theca cells are testosterone and androstenedione.
b) theca cells contain large amounts of aromatase .
c) granulosa cells contain large amounts of aromatase.
d) theca lutein cells produce estrogen.
e) granulosa lutein cells produce progesterone.

23- At physiologically high levels of estrogen in females, all of the following are true except:

a) estrogen negatively feedback on hypothalamus and anterior pituitary .
b) negative short-loop feedback from estrogen on the hypothalamus become positive.
c) negative long-loop feedback from estrogen on the hypothalamus become positive.
d) the GnRH surge depends upon high estrogen levels in a rising phase .
e) a surge in LH/FSH level results.

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24- Which statement about endocrinology is incorrect:

a) A paracrine is released locally and diffuses through extracellular spaces to affect adjacent cells and tissues.
b) FSH hormones are secreted from sertoli cells.
c) the enzyme aromatase converts progesterone and testosterone.
d) protein hormones bind to cell membrane receptors and require second messenger activation to modulate target cell activity .

25- Which statement about endocrinology is incorrect:

a) binding of steroids to carrier proteins protects them from metabolism by liver.
b) continues infusion of GnRH results in increased secretion of LH and FSH from anterior pituitary due to receptor down-regulation.
c) testosterone exhibits a circadian rhythm with higher secretion in the early morning hours.
d) positive feedback is where the signal generator is stimulated by response induced.

26- Which statement about the endocrine control of reproduction is incorrect :

a) inhibin secreted by sertoli cells exerts negative feedback on FSH secretion.
b) in ovarian follicle the granulosa cells produce androgens which are aromatized to estrogen by the theca cells.
c) the enzyme 5-alpha reductase converts testosterone to 5-alpha dihydrotestosterone .
d) development of LH receptors on the granulosa cells must coincide with timing of LH surge for ovulation to take place.

27- Which statement about gonadal function is incorrect :

a) primary oocyte have a diploid chromosome number
b) the primordial follicle is a single layer of squamous cells surrounding a primary oocyte.
c) spermatogenesis requires both FSH and androgen stimulation .
d) mitotic division of oogonia commence at puberty.

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Q2: Put true of false for following statements:

1- GnRH produced by the pituitary gland ( ).
2- LH and FSH play a key role in female physiology, though not active in males( ).
3- Testosterone acts as a positive mechanism to LH & a negative mechanism to the pituitary ( ).

Q3: Write brief notes on the following, try to draw diagram where appropriate:

1- Describe the features of a positive feedback system using a specific example of such a system in human reproduction.
2- List the three feedback mechanism and give a short explanation of each.
3- Explain the two cell of the two gonadotropin theory of steroidogenesis.

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Q4: Give a short account about:

1- Aldosterone releasing synthesis (ARS).
2- Control secretion of thyroid hormone.
3- Mechanism action of either insulin or epinephrine.
4- T3 and T4.
5- Insulin.
6- Hypothalamic hormones.

Q5: Write about two of the following:

1- Write the sequence of events that occur after binding of peptide hormone to its receptor.
2- Write how hormone concentration maintain certain level of hormone response.

Q6: Answer three of the four questions, illustrate your answer with diagram where it is possible:

1- What roles do FSH and LH play in ovulation? How do birth control pills work? Please describe using diagram.
2- The hypothalamus-Pituitary gland axis secrete hormones, how do they know when to stop? Please describe using diagram.
3- What are the 3 types of steroid hormones produced by the ovary? Which is the major steroid secreted during the follicular phase, and which is the major steroid secreted during the luteal phase?
4- What are the four principal roles of insulin?

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BLOOD

Q1: Choose the most correct answer:

1- All the following statements are correct except :

a) Two molecules of ALA condensed together to form one molecule of prophobilinogen by ALA-dehydratase.
b) Four molecules of PBG condensed to form hydroxymethyl-bilane by hydroxymethyl bilane synthase .
c) ALA-dehydratase is the rate limiting enzyme of heme biosynthesis.
d) Hydroxymethyl-bilane forms uroporphyrinogen I by specific synthase.
e) PBG is formed in cytosol

2- The normal brown-red color of feces result from the presence of :

a) stercobilin.
b) bilirubin.
c) biliverdin.
d) urobilinogen.
e) mesobilirubin.

3- Which one of the following statements correctly describes transport of O_2 by hemoglobin :

a) O_2 bind to hemoglobin more avidly than dose CO.
b) the binding of O_2 to hemoglobin cause a valence change in the iron of the haem moiety.
c) each of four haem moieties bind O_2 independently.
d) the plot of percentage of O_2 bound versus O_2 pressure is sigmoidal in shape.
e) increased CO_2 concentrations increase O_2 affinity.

4- Molecular iron, Fe is :

a) stored primarily in the spleen.
b) absorbed in the intestine by albumin
c) excreted in the urine as Fe^{++} .
d) absorbed in the ferric form.
e) stored in the body in combination with ferrtin.

5- Blood represents about ..... Of total body weight:

a) 10 %
b) 5.5 %
c) 8 %
d) 2 %
e) 14%

6- Formation of porphobilinogen occur in:

a) cytosol.
b) mitochondria.
c) Both (A & B).
d) none.

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7- The most successful way for treat congenital erythropoietic prophyria is :

a) liver transplantation.
b) blood transplantation.
c) bone marrow transplantation.
d) kidney transplantation.

8- When bilirubin concentration reach ≥2 mg/dl , this lead to:

a) hepatic jaundice.
b) prehepatic jaundice.
c) Post-hepatic jaundice.
d) all of the above.
e) none of the above.

9- All porphyrias diseases are "autosomal dominant" except:

a) acute intermittent porphyria.
b) variegate porphyria.
c) congenital erythropoietic porphyria.
d) porphyria cutanea tarda.

10- The most useful marker of inflammation is :

a) ESR.
b) CRP.
c) complement-3.
d) ferritin.

11- The most successful way for treat hereditary coproporphyria (HCP) is:

a) Liver transplantation
b) Blood transplantation
c) Bone marrow transplantation
d) Kidney transplantation

12- The plasma protein that involved in zinc transport is:

a) Transferrin
b) α_1-antitrypsin
c) γ-globulin
d) α_2-macroglobulin

13- In porphyrin ring synthesis, ALA synthase is found in:

a) Cytosol
b) Mitochondria
c) Cytosol and mitochondria
d) Microsome

14- Jaundice is noted when bilirubin level is:

a) Less than or equal to 2 mg/dl
b) More than 2 mg/dl
c) Less than or equal to 1.2 mg/dl
d) More than 1 mg/dl

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15- Iron is present in the body as:

a) Transferrin
b) Ferritin
c) Hemosiderin
d) a and b

16- The major source of iron is:

a) Meats
b) Vegetables
c) Fruits

17- The function of albumin in the blood is:

a) Scavenging free radicals
b) Binding and transport
c) Immunity
d) Buffering capacity of blood

18- The oxygen dissociation curve of normal adult hemoglobin is most effectively shifted to the right by:

a) Mixing with fetal hemoglobin
b) Increased 2,3 diphosphoglycerate
c) Cooperative binding of O_2
d) Increased PH
e) Decreased CO_2

19- A decreased affinity of hemoglobin for O2 may result from all the following except:

a) Initial binding of O2 to one of the four sites available in each deoxyhemoglobin molecule
b) High PH
c) High CO2 levels
d) High 2,3-diphosphoglycerate levels within erythrocytes
e) Acidosis

INNOVATIVE MEDICAL STUDENTS

Q2: Complete the following:

1- Each milliliter of blood contains about ..... erythrocytes.
2- Hemoglobin A1c uses as a record for ..... .
3- Microsomes are ..... .
4- Biliverdin reductase reduces the methenyl bridge between ..... and ..... .
5- Densitometer is ..... .
6- Dubin-Johnson syndrome characterized by ..... .
7- The largest cell of the normal blood is ..... .
8- The average lifespan of a platelet is .....
9- Alpha chain of globin part of hemoglobin consist of ..... A.As, while beta chain consist of ..... A.As.

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10- When bilirubin bound to albumin it called ..... or .....
11- The only source for CO production in the body is ..... .
12- The pink teeth is appear in patient with ..... .
13- Clinical symptoms in case of heredity coproporphyria are ..... .
14- Apo ferritin is ..... .
15- Hephaestin is ..... .
16- Coproporphyrinogen has low solubility than ..... .

Q3: Mark true or false in front of the following statements:

1- PBG is formed in cytosol ( ).
2- Four molecules of PGB condense to form hydroxymethyl-bilane by hydroxymethyl-bilane synthase ( ).
3- ALA dehydratase is the rate limiting enzyme of heme biosynthesis ( ).
4- Hydroxymethyl-bilane forms uroporphyrinogen 1 by specific synthase ( ).
5- O_2 binds to haemoglobin more avidly than does CO ( ).
6- The binding of O_2 to hemoglobin causes a valence change in the iron of the haem moiety ( )
7- Each of the four haem moieties binds O_2 independently ( ).
8- Hemin can be reduced to haem by haemoglobin reductase ( ).
9- Bilirubin conjugation is carried out initially in the smooth endoplasmic reticulum ( ).
10- Secretion of conjugated bilirubin into the biliary canaliculi is the rate-limiting step in bilirubin metabolism ( ).

Q4: Write short note about the following :

1- Rate-limiting step of haem biosynthesis.
2- Porphyria cutanea tarda.
3- Haem catabolism
4- Prehepatic jaundice.

Q5: Explain Why :

1- One of the symptoms of iron deficiency anemia is fatigue
2- When and why we analysis for direct bilirubin

Q6: Write about the following :

1- Heme mono-oxygenase enzyme
2- Glucouronyle CoA transferase and clinical importance

INNOVATIVE MEDICAL STUDENTS

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CANCER

Q1: Choose the most correct answer:

1- **Which of the following tumor marker is oncofetal antigen:**
   a) carcinoembryonic antigen.
   b) tissue polypeptide antigen.
   c) cancer antigen 50 (CA-50).
   d) None of the above.

2- **The end product of Aflatoxin (benzo "a" pyrene metabolism) in the body is:**
   a) 2,3-epoxide.
   b) carbonium ions.
   c) 7,8-diol-9,10-epoxide.
   d) none of the above.

3- **Which of the following compound is indirect acting carcinogen:**
   a) nitrosomethylurea.
   b) dimethylnitrosamine.
   c) alkalyting agent.
   d) none of the above.

4- **Programmed cell death is:**
   a) oncogenesis.
   b) apoptosis.
   c) proto-oncogenesis.
   d) none of the above.

5- **Vinyl chloride cause:**
   a) prostate cancer.
   b) ovarian cancer.
   c) lung cancer.
   d) liver cancer.

6- **All the following statements are true about oncofetal antigen except:**
   a) normally produced in the fetus.
   b) disappearance from the blood after puberty.
   c) reactivated with cancer cell.
   d) an examples are AFP and CEA.

7- **P53 is:**
   a) tumor suppressor gene.
   b) tumor activator gene.
   c) antioxidant.
   d) A vitamin.

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8- Carcinoembryonic antigen is:

a) beta globulin
b) alpha goblin.
c) gama globulin.
d) none of the above.

9- Cancer cells are characterized by:

a) diminished control of growth.
b) not invade of local tissues.
c) not spread to other parts of the body.
d) none of the above.

10- All of the following tumor markers are used in screening except:

a) prostate specific antigen.
b) human chorionic gonadotropin.
c) cancer antigen 15-3.
d) alpha fetoprotein.

11- Increased serum globulin (Bence jonce protein) in the following condition:

a) Multiple myeloma.
b) Hepatoma.
c) Benign prostatic hypertrophy.
d) None of the above.

12- All the following statements are true about AflatoxinB$_1$ except:

a) it is a potent hepatocarcinogens.
b) it produced by fungus contaminated to grain.
c) it is an electron deficient atom.
d) it is direct acting carcinogen (not need metabolism).

13- Ultimate carcinogens are the followings except:

a) electron deficient atoms.
b) electron rich atoms.
c) electrophilic compounds.
d) cause cancer when bind to DNA.

14- β-naphthylamine cause:

a) urinary bladder cancer.
b) pancreatic cancer.
c) skin cancer.
d) colon cancer.

15- Serum AFP is increased in the following conditions except:

a) hepatocellular carcinoma.
b) chronic active hepatitis .
c) ovarian cancer.
d) primary biliary cirrhosis.

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16- What is the significance diagnosis of β-HCG:

a) it is a tumor marker for choriocarcinoma.
b) it is a tumor marker for ovarian cancer.
c) it is a tumor marker for breast cancer.
d) none of the above.

17- What is the best tumor marker for diagnosis form prostate cancer:

a) acid phophatase.
b) prostate specific antigen (PSA).
c) alkaline phosphatase .
d) CA 19.9

18- All the following statements are true about transformed cells except:

a) decreased of glycolysis process.
b) increased catabolism of purine base (increased serum uric acid level).
c) changes in composition of glycoproteins on the surface of cells.
d) decreased in serum proteins and albumin in advanced liver cancer.

19- All the following tumor markers are glycoproteins except:

a) β-HCG
b) PSA
c) CA 19.9
d) CEA

20- Which of the following is tumor suppressor gene:

a) P53
b) Aflatoxin B1
c) Allopurinol
d) Nitroxamine

21- CA 125 level increased in the following conditions except:

a) Fallopian tumor
b) Vaginal carcinoma
c) Choriocarcinoma
d) Ovarian cancer

IMS2 INNOVATIVE MEDICAL STUDENTS

Q2: Define sarcoma and lymphoma?

Q3: Explain the mechanism action of aflatoxin. (draw structure)

Q4: Give example of the following:

1- Direct chemical carcinogen
2- Carcinogen that form carbonium ion "CH_3"

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Q5: Give an account on:

1- CA 19.9
2- Alpha fetoprotein
3- Apoptosis
4- Tumor suppressor gene
5- Aflatoxin
6- Metastasis
7- One of the oncofetal antigen

Q6: Answer the following questions:

1- Biochemical changes in tumor cell
2- Explain the metabolic activation of nitrosamine (draw the structure)
3- Mechanism action of chemical carcinogen
4- What are the characteristics of cancer cells?
5- What are the metabolic actions of chemical procarcinogens?
6- Some chemical carcinogen gives epoxide by metabolic activation in the body, explain by chemical structure.
7- What are the clinical applications of tumor markers?
8- Mention the steps and mechanism of action of chemical carcinogen

INNOVATIVE MEDICAL STUDENTS

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RENAL

Q1: Choose the most correct answer:

1- **The production of ammonia in the kidney and excretion of NH_4^- is due to:**
   a) An excess of protein intake.
   b) The decrease of the blood PH.
   c) An increase in the activity of aldosterone.
   d) A problem in the renal tubules.

2- **Metabolic acidosis is due to the following except:**
   a) diarrhea .
   b) diabetes .
   c) decrease in HCO_3^- concentration.
   d) pneumonia.

3- **Diabetes insipidus is :**
   a) an excess loss of water.
   b) an increase in reabsorption of water by renal tubules.
   c) a stimulation of Na^+ reabsorption.
   d) all of the above.

4- **Regulation of fluid volume is controlled by :**
   a) aldosterone.
   b) ADH (antidiuretic hormones)
   c) aldosterone and ADH.
   d) none of the above

5- **The reabsorption of glucose in the kidney occurs mainly in the:**
   a) glomerulor.
   b) distal tubules.
   c) Proximal tubules.
   d) Bowman's capsule.
   e) Loop of Henle

6- **All the following symptoms are found in chronic kidney failure except:**
   a) Anemia .
   b) Polyuria.
   c) Proteinuria.
   d) Hyperphosphatemia.

7- **Hyponatremia is a result of all except:**
   a) vomiting.
   b) metabolic acidosis.
   c) Decrease the activity of aldosterone.
   d) metabolic alkalosis.

IMS INNOVATIVE MEDICAL STUDENTS

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8- The main function of Aldosterone is:

a) increases the reabsorption of Na^+.
b) increase the reabsorption of K^+.
c) increase the reabsorption of Na^+ and K^+.
d) none of the above.

9- The appearance of glucose in urine is :

a) normal.
b) due to a high intake of carbohydrates.
c) due to a problem in carbohydrate metabolism or a renal problem.
d) due to hypoglycemia.

10- The exchange of Na^+ with K^+ or with H^+ mainly takes place in :

a) distal tubules.
b) collecting tubules.
c) proximal tubules .
d) bowman's capsule .

11- Which of the following compounds is completely reabsorbed by the kidney:

a) creatinine.
b) bicarbonate.
c) uric acid.
d) urea.

12- Glomerulonephritis disease is indication of:

a) Appearance of hematouria.
b) Appearance of proteinuria.
c) Appearance of hematouria and proteinuria.
d) none of the above.

13- The most sensitive test for detecting glomular function is :

a) Inulin clearance.
b) creatinine clearance.
c) urea clearance.
d) Isotopes clearance.

14- Uremic is failure of kidney to maintain all the following functions except :

a) secretion.
b) regulation.
c) endocrine.
d) metabolism.

15- In chronic renal disease, all the following are true except:

a) hyperkalemia.
b) accumulation of creatinine and urea in blood.
c) oligouria.
d) hypernatremia.

IMS2 INNOVATIVE MEDICAL STUDENTS

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16- Uremic syndrome is failure of kidney to maintain all the following except:

a) metabolic function.
b) regulatory function.
c) excretion function.
d) homeostasis function.

17- The importance of creatinine clearance Test is to test the function of:

a) proximal convoluted tubule.
b) glomerular.
c) distal tubule.
d) Bowman's capsule.

18- A high concentration of urea in the blood indicates:

a) a high intake of protein.
b) a kidney disease .
c) a liver disease .
d) none of the above.

19- Stimulation of ADH secretion decreases:

a) the reabsorption of water.
b) the excretion of K^+.
c) the urine volume.
d) the reabsorption of Na^+.

20- Diabetes insipidus is :

a) an excess loss of water.
b) an excess reabsorption of water
c) an increase glucose in blood.
d) an excessive loss of glucose.

21- Which of the following compounds is not completely reabsorbed by the kidney:

a) creatinine.
b) uric acid.
c) bicarbonate.
d) urea.

22- All the following compounds are electrolytes except:

a) Bicarbonate
b) Creatinine
c) Sodium
d) potassium

23- The main function of chloride is:

a) to produce HCl.
b) to control blood PH.
c) to regulate water balance.
d) to produce some enzymes.

IMS INNOVATIVE MEDICAL STUDENTS

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24- The most sensitive test for detecting the tubules function is :

a) urine concentration test.
b) urea clearance test.
c) creatinine clearance test.
d) inulin clearance test.

25- In chronic renal failure all the following are symptoms except:

a) anemia.
b) oligurea.
c) hypophosphatemia.
d) proteinuria

26- The blood PH is normally controlled by:

a) H_2CO_3 and HCO_3.
b) only H_2CO_3.
c) only HCO_3.
d) none of the above.

27- The cause of metabolic alkalosis:

a) the biochemical symptoms of acute renal failure .
b) the appearance of glucose in urine.
c) the formation of ammonium in the kidney.

28- All of these are kidney function except:

a) Synthesis of erythropoietin.
b) Activation of vitamin D .
c) Maintain water balance and osmotic pressure.
d) Synthesis of uric acid.

29- 70% of Na is reabsorbed in :

a) PCT.
b) DCT.
c) collecting duct .
d) loop of henle.

30- Creatinine is reabsorbed in:

a) proximal tubules.
b) loop of henle.
c) glomerulus.
d) none of the above.

31- Metabolic acidosis is:

a) increase PH.
b) due to increase carbonic acid.
c) due to decrease bicarbonate.
d) all of the above.

IMS INNOVATIVE MEDICAL STUDENTS

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32- Hyponatremia is due to :

a) acidosis.
b) decrease ADH
c) increase aldosterons activity.
d) all of the above.

33- In respiratory alkalosis :

a) decrease bicarbonate.
b) bicarbonate /carbonic acid ratio more than 20 .
c) bicarbonate /carbonic acid ratio less than 20 .
d) increase H_2CO_3.

34- Chronic renal diseases are mostly caused by two very important systemic diseases :

a) diabetes insipidus .
b) liver cirrhosis.
c) hypertension.
d) diabetes mellitus.

35- The artificial kidney is :

a) an inherited defect in the proximal tubules .
b) an extracorporeal dialysis.
c) a supportive treatment for uremic patients.
d) a kidney transplant.

36- Increased blood urea may be caused by :

a) decreased cardiac output .
b) increased protein catabolism.
c) strenuous exercise.
d) overproduction of purine catabolism.

37- Progressive renal diseases are evaluated by:

a) urine culture .
b) radiologic evaluation .
c) percentage (% age) of functioning nephrons .
d) plasma creatinine concentration .

38- Which of the following stages of progressive renal diseases is symptomatic :

a) decreased renal reserve.
b) renal insufficiency.
c) acute renal failure.
d) chronic renal failure.

39- Which is true about uremic syndrome :

a) all uremic patients require renal dialysis.
b) Is always characterized by irreversible damage to the nephrons.
c) is the terminal clinical manifestation of kidney failure.
d) is associated with reduced endocrine function.

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INNOVATIVE MEDICAL STUDENTS

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40- Anoxia causes respiratory acidosis and is due to the following except :

a) fluid in lungs.
b) heart failure .
c) low blood pressure .
d) diabetic mellitus.

41- The major buffer system in the body is :

a) phosphate.
b) hemoglobin.
c) Bicarbonate / carbonate.
d) proteins.

42- The following are functions of main electrolytes in the body except :

a) water balance and blood volume.
b) blood pressure and osmolarity.
c) water products excretion.
d) Buffer & PH regulation.

43- Hypercholeremia is indicated by the following conditions :

a) Acidosis, increase intake of NaCl and NH_4Cl.
b) Alkalosis, increase intake of NaCl and NH_4Cl.
c) Acidosis, increase intake of NaCl and decrease intake of NH_4Cl.
d) None of the above.

44- The compensatory of the correction mechanism for control PH is by :

a) phosphate buffer.
b) increase excretion of sodium salt.
c) ammonium formation in tubules .
d) all of the above.

45- In normal condition, which of the following are completely reabsorbed by tubules :

a) glucose and water.
b) glucose and bicarbonate .
c) water and Na^+.
d) water and bicarbonate.

46- All of the following are requirements for a substance to be used as clearance except:

a) completely reabsorbed.
b) constant concentration in plasma during the test.
c) easy to measure in urine and plasma.
d) Completely excretion

47- The regulation of fluid volume and osmotic pressure is controlled by:

b) aldosterone .
c) aldosterone and ADH.
d) ADH.
e) none of the above.

INNOVATIVE MEDICAL STUDENTS

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48- Nephrotic syndrome is indicated by the following except:

a) Hematuria.
b) proteinuria.
c) hypoalbuminemia.
d) hyperlipidemia.

49- The common type of kidney stone is:

a) Cholesterol
b) Cystine
c) Calcium oxalate
d) Uric acid

50- The followings are the functions of the electrolytes except:

a) To control acid base balance
b) To produce some hormones
c) To control osmotic pressure
d) To control water balance

51- Glucose is reabsorbed in:

a) Proximal tubules
b) Distal tubules
c) Loop of Henle
d) Glomerulus

Q2: Complete the following:

1- The filtration process occurs on .....
2- The presence of sugar in urine however normal in blood indicates .....
3- The hormones that control reabsorptions of sodium and water are ..... and .....
4- .....can be caused by prior infection with haemolytic streptococcus.
5- ..... Disease characterized by albuminuria.

IMS INNOVATIVE MEDICAL STUDENTS

Q3: Indicate if each of the following statements is true "T" or false "F":

1- Kidney has two main functions: to reabsorb soluble waste products of metabolism and to maintain water balance ( ).
2- A high concentration of glucose in the blood occurs when there is a defect in the kidney and carbohydrate metabolism ( ).
3- In the proximal convoluted tubule, urea, phosphate and Ca^{2+} are completely reabsorbed ( ).
4- Antidiuretic hormone (ADH) is produced by the kidney and stored in the posterior pituitary gland ( ).
5- Stimulation of antidiuretic hormone secretion decreases the reabsorption of water (increase in urine volume) ( ).
6- The blood PH is normally controlled by the ratio of $[H_2CO_3]/[HCO_3]$ ( ).

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7- A high concentration of urea in the blood indicates a high intake of protein ( ).
8- Anemia can be a result of renal disease or kidney failure ( ).
9- Purpose of creatinine clearance test is to test the function of proximal convoluted tubule and distal tubule ( ).
10- Appearance of some proteins in the urine indicates a high intake of proteins ( ).
11- Uremic syndrome is failure of kidney to maintain metabolic function ( ).
12- The production of ammonia in the kidney and excretion of NH4 is due to an excess of protein intake ( ).
13- Diabetes insipidus is an excessive loss of water ( ).
14- Hyponatremia is a result of metabolic acidosis ( ).
15- Regulation of fluid volume is controlled by ADH (antidiuretic hormones) only ( ).
16- The exchange of Na^+ with K^+ or with H^+ mainly takes place in collecting tubules ( ).
17- The reabsorption of glucose in the kidney occurs mainly in the proximal tubules ( ).

Q4: Explain the causes of the following:

1- Metabolic acidosis.
2- Appearance of glucose in urine.
3- Respiratory alkalosis.
4- Formation of ammonia in kidney.
5- Hypernatremia.
6- Oligourea.

Q5: Answer the following questions:

1- Function of electrolytes.
2- Mechanism of excreting acid.
3- The cause of metabolic alkalosis
4- The biochemical symptoms of acute renal failure
5- The appearance of glucose in urine
6- The formation of ammonium in the kidney
7- What is proteinuria, give the causes
8- What is the metabolic characteristic of the kidney

Q6: Give the reasons for:

1- Urine is hyperosmolar and more acidic than plasma?
2- Laboratory tests are important in diagnosis of kidney diseases?
3- Hyperphosphatemia
4- Hyperkalemia
5- Increase blood pressure in kidney disease
6- Enzymes excretion in urine (give examples)
7- Metabolic acidosis

INNOVATIVE MEDICAL STUDENTS

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Q7: Explain briefly:

1- Chloride isn't involved in acid-base balance.
2- Chloride shift.
3- Kidney as endocrine gland

Q8: Define the following:

1- Uremic syndrome.
2- The importance of urine concentration test.
3- The function of kidney as an endocrine gland.

Q9: Write a short note on the following:

1- Kidney is an endocrine gland.
2- Function of aldosterone hormone.
3- Metabolic acidosis.
4- Creatinine clearance test.

Q10: Predict the causes of the following:

1- High concentration of uric acid in the urine
2- Oligourea
3- Metabolic alkalosis

Q11: Give short account on:

1- Ketoneuria
2- Ammonia secretion and excretion in the kidney
3- Hartnup disease
4- PUK

IMS INNOVATIVE MEDICAL STUDENTS

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Answer Key

Gastrointestinal Tract

Ture or False

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	F	5	T*	9	F	13	F	17	T
2	F	6	F	10	F	14	F	18	F
3	T	7	F	11	F	15	T	19	F*
4	F	8	T	12	T	16	F*	20	T*

Molecular

MCQs

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	B	13	D	25	B	37	B	49	C*
2	C*	14	C	26	D	38	B	50	C
3	A	15	A	27	D* , B*	39	C	51	C* , A
4	C	16	B	28	B	40	D	52	B
5	C	17	A	29	B	41	A	53	C*
6	A*	18	C	30	C	42	C	54	D
7	A	19	C	31	B	43	D	55	C*
8	A	20	D	32	C	44	C*	56	C
9	D	21	A	33	C	45	D	57	
10	D	22	C	34	B	46	A	58	
11	D	23	C	35	C	47	D*	59	C
12	D	24	D	36	C	48	A*	60	

Respiration

MCQs

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	B	15	B	29	D	43	C	57	D
2	C	16	D	30	C	44	A	58	D to blood
3	C	17	B	31	B	45	B	59	C
4	D	18	D	32	B	46	C	60	A
5	A	19	A	33	D	47	C	61	A
6	B	20	A	34	D	48	C	62	A
7	A	21	A* , D*	35	D	49	B	63	D
8	A*	22	A	36	C	50	C	64	A
9	C	23	B	37	B	51	B	65	C
10	C	24	A	38	A	52	C	66	B
11	B	25	D	39	C	53	D	67	D
12	B	26	D	40	A	54	B		
13	C	27	C	41	A	55	B		
14	B	28	B	42	B	56	A		

INNOVATIVE MEDICAL STUDY

Scanned by CamScanner

Endocrine

MCQs

No.	Answer	No.	Answer	No.	Answer	No.	Answer	Ture or False	
								No	Answer
1	D	8	D	15	A	22	B	1	F
2	D	9	D	16	A	23	B	2	F
3	D	10	B	17	C	24	B	3	F
4	C	11	A	18	B*	25	B		
5	C	12	C	19	B	26	B		
6	C	13	B	20	B	27	D		
7	C	14	D	21	A*				

Blood

MCQ

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	C & D	5	C	9	C	13	B	17	B
2	A	6	A	10	B	14	B	18	B
3	D	7	C	11	C	15	B	19	A & B
4	E	8	D	12	D	16	A		

Ture or False

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	T	3	F	5	F	7	F	9	T
2	F	4	F	6	F	8	T	10	T

Cancer

MCQ

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	A	6	B	11	A	16	A	21	C
2	*A or C*	7	A	12	D	17	B		
3	B	8	A	13	B	18	A		
4	B	9	A	14	A	19	C		
5	C	10	C	15	C	20	A		

Renal

MCQ

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	B	15	C	29	A	43	B	4	F
2	D	16	A	30	D	44	D	5	F
3	A	17	B	31	C	45	B	6	F
4	C	18	A*	32	A	46	A	7	T
5	C	19	C	33	B	47	C	8	T*
6	C	20	A	34	C & D	48	A	9	F
7	D	21	D	35	B & C	49	C	10	F*
8	A	22	B	36	B & C	50	B	11	
9	C	23	A	37	C & D	51	A	12	T*
10	A	24	A	38	A & B	Ture or False		13	T*
11	B	25	C	39	A & C*	No.	Answer	14	T*
12	C	26	A	40	D	1	F	15	F
13	B	27		41	C	2	F	16	T*
14	D	28	D	42	C	3	F	17	T*

INNOVATIVE MEDICAL STUDENTS

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Gastrointestinal Tract

Blanks

No.	Answer
1	Chief cells , HCl
2	Histamine, muscarinic cholinergic, gastrin
3	Acids, fear and depression, GIP, VIP
4	I cells, 5 A.A from COOH, fats, F.As, Ca^{+2}
5	a)failure of the secretion hormone to stimulate enough alkaline pancreatic or bile secretion b)Rapid emptying of the gastric contents into the duodenum c)Gastric hypersecretion d)Helicobacter pylori
6	Basic A.As , uncharged A.As , aromatic amino acids
7	Histamine , serotonin
8	Amylolytic , proteolytic , nucleolytic
9	Defect in digestion and lipolysis , Defect in absorption
10	There will be less time for modification in ducts, & the levels of Na^{+},Cl^{-} and HCO_3^{-} increase
11	a)Excess cholesterol in bile , b)Decrease bile salts in bile
12	Defect in chloride channel (CFTR) occurring in CF *
13	Chronic hemolytic syndrome , cystic fibrosis
14	
15	Gastric , Hepato-biliary , pancreatic
16	Mouth , maltose , maltotriose , α-dextrin
17	Maltose , maltotriose , oligosaccharides , pancreatic α-amylase
18	Alkaline tide
19	a)Mouth → salivary amylase, b)Duodenum → pancreatic α-amylase, c)Intestine → disacch
20	Acute gastritis → is an acute mucosal inflammatory process usually transient , Chronic gastritis → the presence of chronic mucosal inflammatory changes leading eventually to mucosal atrophy and epithelial metaplasia
21	Lack of absorption of any or all of the constituents of food
22	Deficiency of gastric mucin , pernicious anemia
23	Converting Fe^{+3} to Fe^{+2}
24	Cholic acid and chenodeoxy cholic acid
25	Chloride shift and carbonic anhydrase
26	5 A.A.
27	Direct input from CNS and local reflexes
28	cAMP production *
29	Glutamyl transpeptidase , γ glutamyl group , amino group
30	Active transport
31	Defect in enzymes of digestion of gluten peptides
32	Reduction of pH in the pyloric antrum below 2 , duodenal distension through enterogastric reflex and release of inhibitory hormones , fear and depression
33	Last 5 A.A.s from COOH-terminal , food in stomach, distension of the antrum, vagal stimulation
34	HCO_3^{-} and other electrolytes
35	Aromatic or dicarboxylic amino acids , peptide bonds of basic A.A.s
36	Fats , F.A.s , A.A.s in the duodenum , presence of HCl on duodenal mucosa

IMS FOR MEDICAL STUDENTS

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Molecular

Blanks

No.	Answer
1	A type of genes that have DNA sequences resembling normal genes but are not expressed
2	Guanine , cytosine
3	A sign used to differentiate between the number of the carbon atom of nitrogen base and pentose rings
4	Ori C
5	Is a break in phosphodiester bond of one strand of DNA in a double helix
6	Errors in replication , mutagens , irradiation
7	Specifity , universality , reading frame
8	Single base change result in the replacement of one A.A. by another with completely different function
9	Ultraviolet light (UV)
10	Nucleotide excision repair
11	Capping , polyadenylation , splicing
12	DNA replication , depurination , ionizing radiation
13	DNA synthesis
14	Removal of primes during DNA replication
15	Elongation , DNA polymerase *
16	Removal of the mismatched nucleotide in reverse direction ($3^- \rightarrow 5^-$)
17	Certain hydrogen atoms bound to the bases are able to change their location on bases either from an amino or hydroxyl side group This result in two forms: a)amino-imino isomers b)keto-enol isomers
18	Changing bases sequence of DNA without altering its coding function, guanine & cytosine
19	Double helix , antiparallel strands
20	A form , B form , Z form
21	Is linear or circular
22	Is the total genetic information presented by the group of chromosomes in any cell
23	Sequence of nucleotides along a DNA molecule
24	Homeotic gene , mobile gene , pseudo gene , structural gene , regulatory gene , onco gene
25	Modified
26	mRNA and tRNA
27	Addition of poly A tail , maintains intracellular stability of specific mRNA
28	Cap , stabilization and recognition of mRNA
29	Protein kinase , regulate function in cell *
30	$5^- \rightarrow 3^-$
31	Protein assembly at the origin of replication
32	Stabilize the single strands
33	Proof reading , excision repair
34	Polymerase II * , *
35	Generate complementary DNA from an RNA template *
36	Prevent the loss of essential genetic information, telomerase, cancer cells*, human normal cells*
37	Approximately 100 nu/s , is much slower *
38	DNA , transfer of information from DNA to RNA
39	For initiation of transcription in certain sequence of bases located in the beginning of stretch on one of the two strands of the DNA *

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Molecular (continue)

No.	Answer
40	Relieves torsional strain generated by DNA unwinding
41	Sigma factor (σ) and core enzyme
42	Rho dependent termination , Rho independent termination *
43	Functional gene product, transcription of gene into mRNA and its translation into protein
44	RNA polymerase , DNA
45	Is binding of RNA polymerase to DNA at particular region
46	Addition or deletion of a base
47	
48	
49	
50	
51	
52	
53	
54	

Blood

Blanks

No.	Answer
1	5 billion
2	Blood glucose level over 2-3 months
3	A small particle in the cytoplasm consists of fragmented endoplasmic reticulum
4	Pyrrole III → pyrrole IV
5	A device used for measuring the density of light
6	Black pigments in liver
7	Monocyte
8	10 days
9	141 – 146
10	Unconjugated – indirect
11	Heme catabolism
12	Congenital erythropoietic porphyria
13	Photosensitivity , abdominal pain and neuropsychiatric symptoms
14	Is ferritin that is not combined with iron
15	Transmembrane copper-containing protein which have ferroxidase activity (converts Fe^{+3} to Fe^{+3} to be transported)
16	Uroporphyrinogen *

Renal

Blanks

No.	Answer
1	
2	
3	
4	
5	

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